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# Specification

Devices for the Pressing of a Tympan to a Cylinder of a Printing Machine and Method for Tightening or Slackening Said Tympan

The invention relates to devices for pressing a dressing against a cylinder of a printing press with the aid of first and second rolling elements, which are spaced apart from each other in the circumferential direction of the cylinder, and to a method for bracing or removing such a dressing in accordance with the preamble of claims 1, 5, 10, 22, 31 or 36.

A device for pressing a dressing against a cylinder of a printing press with the aid of several rolling elements, in particular rollers, arranged along the cylinder is known from EP 0 712 725 A2.

WO 01/87613 A1 describes a method and several embodiments of a device for pressing a dressing against a cylinder of a printing press, wherein several rollers are pressed against the cylinder by an actuating means during mounting and dismounting of a dressing. The actuating means can be designed as a reversibly deformable hollow body, for example a tube, which can be charged with a pressure medium. By charging the hollow body with the pressure medium, a rigid roller support, which is substantially embodied in the form of a die, is pressed against the cylinder against the force of a spring. In one exemplary embodiment, the roller support is embodied as a rocker or as a one-armed lever. In addition to the first rollers, which are spaced apart from each other and can be placed against the cylinder for mounting fresh dressings, another exemplary embodiment provides a plurality

of second rollers, which can be placed against the cylinder for dismounting dressings. Two actuating means, which can be operated independently of each other, can be provided for placing the first and second rollers against the cylinder.

A device for pressing a dressing against a cylinder of a printing press with the aid of first and second rolling elements arranged one behind the other in the circumferential direction of the cylinder is known from DE 196 39 800 C1, wherein the rolling elements can only be placed against or moved away from the cylinder together.

A device for mounting flexible printing plates is known from DE 197 19 559 A1, wherein a pressure roller is arranged on a holder embodied, for example, as a leaf spring, wherein the holder is connected with an insertion slider, wherein the insertion slider can be placed against a forme cylinder by means of a linear movement and in the process introduces an end of the printing plate into a fastening slit cut into the forme cylinder.

A device for the automatic feeding of printing plates to a cylinder is known from USP 5,406,888, wherein two rolling elements, arranged one behind the other in the circumferential direction of the cylinder, are arranged on a rigid lever which can be jointly pivoted against the cylinder, wherein one rolling element is arranged in the pivot point of the lever.

A manipulating device for automatically mounting or dismounting printing plates on a cylinder is known from USP 4,727,807, wherein a gripper of the manipulating device has two rolling elements arranged one behind the other in the circumferential direction in a common frame.

The object of the invention is based on creating devices for pressing a dressing on a cylinder of a printing

press with the aid of first and second rolling elements which are spaced apart from each other in the circumferential direction of the cylinder, and to a method for bracing or removing such a dressing.

In accordance with the invention, this object is attained by means of the characteristics of claims 1, 5, 10, 22, 31 or 36.

The advantages to be gained by means of the invention consist in particular in that the device can be constructed to be very flat, and therefore in a space-saving manner, which is very advantageous in view of the existing structural conditions of a printing press. A preferably layered arrangement of the supports results in that the device can also be constructed in a very compact manner in the circumferential direction of the cylinder, because in spite of using rolling elements arranged one behind the other in the circumferential direction of the cylinder, the total of two lever arms placed in series is not required as the structural space, but only slightly more than the length of one lever arm.

Furthermore, the device is resistant to dirt and more rugged than an arrangement with supports attached to a hinge, for example, because the hinge at the intended installation location must be protected against soiling, such as ink splatters or dust, for interference-free functioning, which entails an additional outlay.

Because the supports for the rolling elements are designed as an elastically bendable body, in the course of the interaction with the actuating means acting on the support no separate spring element is required for returning the supports into their initial position after an operation

of the actuating means, because the support has an inherent spring-back property.

In addition to the fact that by means of the proposed arrangement of the supports and rolling elements a very flat structural shape is achieved, functional advantages arise from the tandem arrangement of the rolling elements. Thus, dressings resting on the surface area of the cylinder can remain fixed in place as needed by means of the first rolling element, although the second rolling element releases an end of a dressing or of several dressings, i.e. does not press them on at this time. If in respect to a particular dressing the first and the second rolling elements are placed against the cylinder, advantageous friction values and guide conditions result for delivering and transporting this dressing.

A further advantage is the easy accessibility of the actuating means for pressing dressings against a cylinder, which is of particular importance if a large amount of rolling elements with their supports is to be placed against and moved away from the cylinder independently of each other.

Exemplary embodiments of the invention are represented in the drawings and will be described in greater detail in what follows. Shown are in:

Fig. 1, a device for pressing a dressing against a cylinder of a printing press with the aid of rolling elements,

Fig. 2 to Fig. 4, the progression of a method for bracing a flexible dressing on a cylinder of a printing press with the aid of rolling elements arranged on elastically bendable supports,

Figs. 5 and 6, a method step when releasing a flexible dressing from a cylinder of a printing press with the aid of rolling elements arranged on elastically bendable supports,

Fig. 7, an assignment of rolling elements arranged on second supports to several dressings applied side-by-side on a cylinder while one of these dressings is removed.

A dressing 01 is brought to a cylinder 02 of a printing press, for example a web-fed rotary offset printing press. The dressing 01 can be, for example, a flexible, in particular elastically flexible printing forme 01, which is to be placed on a forme cylinder 02. A suspension leg 03a, beveled off at a leading end of the dressing 01, is suspended, preferably positively connected, at a correspondingly embodied first wall 04 of a preferably slit-shaped opening 07 cut into the surface area 06 of the cylinder 02. If the dressing 01 extends over the entire circumference of the cylinder 02, a single such opening 07 in the cylinder 02 can be sufficient (Fig. 1). In case of several dressings 01 to be applied in the circumferential direction of the cylinder 02, several, preferably identically designed openings 07 are located in the cylinder in an arrangement where they are offset along the circumference. With two dressings 01 in the circumferential direction, the openings 07 are arranged offset by 180° in respect to each other, for example. In this case a suspension leg 03a at the leading end of the one dressing 01 is fastened in the first opening 07, while a suspension leg 03b at the trailing end of the same dressing 01 is fastened in the other opening 07 (not represented). With a 6/2 printing press, the preferred arrangement consists of two dressings 01 in the circumferential direction of the cylinder 02, and six side-

by-side arranged dressings 01 in the axial direction of the cylinder 02.

The opening 07 leads to a channel 08 extending along the cylinder 02, in which a holding device, for example a clamping device, is located, which substantially consists of a holding means 12, pivotably seated in a groove 11 on the bottom 09 of the channel 08, as well as of a spring element 14 clamped between a wall of the channel 08 and the holding means 12 (Fig. 1). The holding means 12, which is advantageously embodied as a rigid lever, is pivotable, counter to the force of the spring element 14, by an actuating means 16 supported in the channel 08 for releasing a clamped connection provided by the holding means 12 on the second wall 17 of the opening 07. Thus, the holding means 12 has a holding position as its operating position, in particular a clamping position, and a release position. Such a clamping device is described, for example in DE 100 58 996 C1. For explaining further details of the clamping device and its function reference is expressly made to the above mentioned document.

A holder 21, for example a cross arm 21 extending along the cylinder 02, is provided in the vicinity of the cylinder 02 at a distance from the cylinder 02, wherein a device for pressing a dressing 01 against the cylinder 02 of the printing press with the aid of pressing elements 31, 32, preferably rolling elements 31, 32, is arranged on the holder 21, wherein the rolling elements 31, 32 can be placed against the cylinder 02, or moved away from it. A first support 22 with a first end 23 and a second end 24, and a second support 26 with a first end 27 and a second end 28, are provided here, wherein in one embodiment the first end 23 of the first support 22 is fixedly connected with the cross arm 21

extending along the cylinder 02. At least one first rolling element 31 is arranged on the second end 24 of the first support 22. The first end 27 of the second support 26 is also connected with the first support 22, preferably with its second end 24 and preferably in a fixed manner, wherein the first support 22 and the second support 26 are substantially arranged layered one on top of the other, wherein the first end 27 of the second support 26 preferably terminates flush with the second end 24 of the first support 22. At least one second rolling element 32 is arranged on the second end 28 of the second support 26. The first rolling element 31 and the second rolling element 32 are thus arranged spaced apart one behind the other in the circumferential direction of the cylinder 02 so that, as can be seen in the drawings, a so-called double-roller or tandem roller arrangement results. The term tandem roller arrangement indicates that two substantially identical structural components, here pressing elements or rolling elements, are arranged one behind the other in the circumferential direction of the cylinder.

For placing the rolling elements 31, 32 against the cylinder 02 or moving them away from it, a first actuation means 33 acting on the first element 22 and a second actuating means 34 acting on the second support 26 are provided, wherein the first actuating means 33 and the second actuating means 34 can be actuated independently of each other. The achievement of such an independent placement of the rolling element 31, 32 against or away from the cylinder is of particular advantage when several dressings 01 have been arranged side-by-side in the axial direction on the cylinder 02, and it is intended to selectively clamp or release dressings 01 individually. For example, during the removal of a single dressing 01 the remaining dressings 01

can be securely maintained on the cylinder 02 by means of rolling elements 31, 33 appropriately placed against them, even if a common holding means 12 of a holding device, which is mutually arranged for several dressings 01, is opened and thus releases the fastening of the dressings 01 on the cylinder 02.

The actuating means 33, 34 are embodied for example in the form of a reversibly deformable hollow body, for example as a tube 33, 34, which can be charged with a pressure medium. For example, the first actuating means acting on the first support 22 can be supported on a rigid stop 29, which is fixedly connected with the cross arm 21 or has been formed on it, since the first actuating means 33 in particular is arranged between the cross arm 21, or the stop 29, and the first support 22, while the second actuating means 34 acting on the second support 26 is preferably arranged between the first support 22 and the second support 26 and is preferably supported on the first end 23 of the first support 22 connected with the cross arm 21. It is advantageous to embody the second support 26 to be longer than the first support 22, and this with such an excess projection that the second rolling element 32 arranged on the second end 28 of the second support 26 can be positioned laterally in respect to the cross arm 21 during the non-actuated state of the second actuation means 34, but preferably without touching the cross arm 21.

It is of advantage to embody each of the supports 22, 26 in the form of an elastically bendable, i.e. reversibly deformable body, in particular in the shape of a blade, for example as resilient sheet metal piece 22, 26. If, by operating an associated actuating means 33, 34, a support 22, 26 can be elastically bent for placing a rolling element 31,



32 against the cylinder 02, no additional means are required for moving the rolling elements 31, 32 arranged on the supports 22, 26 away from the cylinder after an actuation of the associated actuating means 33, 34. In this embodiment the supports 22, 26 spring back into their original position without the cooperation of forces acting from the outside.

The rolling elements 31, 32 can be embodied as a roll 31, 32 or a roller 31, 32. Also, several first supports 22, each with at least one first rolling element 31, can be arranged side-by-side on the cross arm 21, wherein these rolling elements 31 can be placed against or moved away from the cylinder 02 independently of each other either individually or in groups by means of first actuating means 33 assigned to their supports 22. In the same way it can be advantageous to arrange several second supports 26, each with at least one second rolling element 32, side-by-side on the first support 22, wherein these rolling elements 32 can be placed against or moved away from the cylinder 02 independently of each other either individually or in groups by means of second actuating means 34 assigned to their supports 26. A preferred embodiment provides that a roller 31 extending along the cylinder 02 and several second supports 26 with at least one roll 32 are arranged on the first support 22. This embodiment becomes particularly useful in the case where the cylinder 02 has several dressings 01 side-by-side, and a second support 26 with at least one second rolling element 32 is assigned to each dressing 01.

In accordance with a further exemplary embodiment, the device for pressing a dressing 01 against a cylinder 02 of a printing press can be designed in such a way that a plurality of dressings 01 can be arranged on the cylinder 02 side-by-

side in the axial direction, wherein pressing elements 31, 32 assigned to a dressing 01 can be placed against, or moved away from a cylinder 02 independently of pressing elements 31, 32 assigned to another dressing 01, wherein this device is distinguished in that the pressing elements 31, 32 are embodied as rolling elements, in particular as rollers 31, 32. In this case the pressing elements 31, 32, or rolling elements 31, 32 can be placed against the cylinder 02 at least intermittently during its rotation. Or, the device for pressing a dressing 01 against a cylinder 02 of a printing press with the aid of rolling elements 31, 32 has several first rolling elements 31, as well as several second rolling elements 32 in the axial direction of the cylinder 02, wherein the second rolling elements 32 are arranged spaced apart in the circumferential direction of the cylinder 02 from the first rolling elements 31. This case is also distinguished in that individual or groups of second rolling elements 32 can be placed against the cylinder 02, or moved away from it, independently of individual or groups of first rolling elements 31. It is also possible to place all first rolling elements 31 against the cylinder, and the second rolling elements 32 can be partly placed against or moved away from the cylinder.

From Figs. 1 to 4 it is possible to infer a method for bracing a flexible dressing 01 on a cylinder 02 of a printing press with the aid of rolling elements 31, 32, which are arranged, spaced apart in the circumferential direction of the cylinder 02 at supports 22, 26, which are preferably elastically bendable, wherein the dressing 01 has suspension legs 03a, 03b beveled off its ends, wherein the cylinder 02 has an opening 07 cut into its surface area 06 and has a first wall 04 and a second wall 17, wherein the opening 07

leads to a channel 08 with a holding device with a holding means 12 arranged therein arranged in the cylinder 02, wherein the holding means 12 of the holding device has a holding position and a release position as its operating positions, which method is distinguished by the following method steps:

While the rolling elements 31, 32 are moved away from the cylinder 02, the suspension leg 03a at the leading end of the dressing 01 is brought, preferably tangentially, against the surface area 06 of the cylinder 02 and is suspended on the first wall 04 of the opening 07 cut into the surface area 06 of the cylinder 02.

Thereafter, the rolling elements 31, 32 are placed against the cylinder 02 by operating the actuating means 33, 34 acting on their supports 22, 26.

Afterwards, the cylinder 02 is rotated in the production direction P sufficiently far so that the suspension leg 03b on the trailing end of the dressing 01 rests on the second wall 17 of the latter, or on an identically embodied second opening 07, arranged on the circumference of the cylinder 02 offset in respect to the first opening 07, wherein the rolling elements 32 press the dressing 01 against the surface area 06 of the cylinder 02.

The rolling element 32 located nearest the trailing end of the dressing 01 presses the suspension leg 03b into the opening 07, and the holding means 12 holding the dressing 01 changes from its release position to its holding position.

Thereafter the rolling elements 31, 32 are moved away from the cylinder 02.

A method for releasing a flexible dressing 01 from a cylinder 02 of a printing press with the aid of rolling elements 31, 32 arranged on preferably elastically bendable

supports 22, 26, wherein a first rolling element 31 is arranged on a first support 22, and a second rolling element 32 on a second support 26, and both rolling elements 31 are arranged spaced apart in the circumferential direction of the cylinder 02, wherein several dressings 01 can be arranged side-by-side in the axial direction on the cylinder 02, wherein each dressing 01 has suspension legs 03a, 03b beveled off its ends, wherein the cylinder 02 has at least one opening 07 cut into its surface area 06 and has a first wall 04 and a second wall 17, wherein the opening 07 leads to a channel 08 arranged in the cylinder 02 with a holding device with a holding means 12 arranged therein, wherein the holding means 12 of the holding device has a holding position and a release position as its operating positions, is represented in Figs. 5 to 7 and is distinguished by the following method steps:

The rolling elements 31, 32 are placed against one or several dressings 01 resting on the surface area 06 of the cylinder 02.

The cylinder 02 is rotated until the rolling element 32 arranged on the second support 26 rests against the suspension leg 03b of the trailing end of a dressing 01 to be removed.

The rolling element 32 resting against the suspension leg 03b of the trailing end of the dressing 01 to be removed is moved away from the cylinder 02, and the holding means 12 changes into its release position, preferably by pivoting, whereupon the suspension leg 03b at the trailing end of a dressing 01 to be removed automatically springs out of the opening 07 because of its internal tension, while the suspension legs 03b at the trailing ends of further dressings 01 resting on the cylinder 02 remain pressed on by means of

the rolling elements 32 pressing them against the second wall 17 of the opening 07.

Thereafter, the holding means 12 of the holding device preferably changes back into its holding position, and the cylinder 02 rotates counter to its production direction P until the suspension leg 03a at the leading end of the dressing 01 to be removed can be unhinged from the first wall 04 of the opening 07 and therefore can be removed from the cylinder 02.

A method for releasing a flexible dressing 01 from a cylinder 02 of a printing press with the aid of rolling elements 31, 32 arranged on preferably elastically bendable supports 22, 26, wherein a first rolling element 31 is arranged on a first support 22, and a second rolling element 32 on a second support 26, and both rolling elements 31 are arranged spaced apart in the circumferential direction of the cylinder 02, wherein several dressings 01 can be arranged side-by-side, preferably in the axial direction, on the cylinder 02, wherein each dressing 01 has suspension legs 03a, 03b beveled off its ends, wherein the cylinder 02 has at least one opening 07 cut into its surface area 06 and has a first wall 04 and a second wall 17, wherein the cylinder 02 has at least one opening 07 cut into its surface area 06 and has a first wall 04 and a second wall 17, wherein the opening 07 leads to a channel 08 arranged in the cylinder 02 with a holding device with a holding means 12 arranged therein, wherein the holding means 12 of the holding device has a holding position and a release position as its operating positions, can also be distinguished by the following method steps:

The rolling elements 31, 32 have been moved away from all dressings 01 resting on the surface area of the cylinder 02.

The cylinder 02 rotates until the rolling elements 32 arranged on the second support 26 are located above the suspension legs 03b at the trailing ends of the dressings 01, i.e. are out of contact, but still in their near vicinity.

Then all rolling elements 31 arranged on the first support 22 are placed against the cylinder 02, by means of which the dressings 01 are pressed against the surface area 06 of the cylinder 02 from their trailing ends at a distance corresponding to the distance between the rolling element 31 arranged on the first support 22 and the rolling element 32 arranged on the second support 26.

The holding means 12 of the holding device changes into its release position, preferably by pivoting, whereupon the suspension legs 03b at the trailing ends of all dressings 01 automatically spring out of the opening 07 because of their internal tension.

Except for their trailing ends, the dressings 01 remain fixed on the surface area 06 of the cylinder 02 because of the rolling elements 31 placed against the cylinder 02.

Except for those at the trailing end of a dressing 01 to be removed, now all rolling elements 32 arranged on the second support 26 are placed against the cylinder 02, so that the suspension legs 03b at the trailing ends of all dressings 01 resting on the cylinder 02, with the exception of the dressing 01 to be removed, are again placed against the second wall 17 of the opening 07 by the rolling elements 32 pressing them against it.

Thereafter, the holding means 12 of the holding device changes into its holding position, and all rolling elements 31, 32 are moved away from the cylinder 02.

Now the cylinder 02 rotates counter to its production direction P until the suspension leg 03a at the leading end of the dressing 01 to be removed can be unhinged from the first wall 04 of the opening 07, and thus can be removed from the cylinder 02.

Fig. 7 shows the assignment of rolling elements 32 arranged on several second supports 26 to several dressings 01 applied side-by-side to a cylinder 02 in the course of the removal of one of these dressings 01. In the example represented, three rolling elements 32 are assigned to a dressing 01. These rolling elements 32 can be placed against or moved away from the cylinder 02 independently of the remaining rolling elements 31, 32, while adjoining dressings 01, for example, are pressed against the surface area 06 of the cylinder 02. Here, the rolling element 31 is a continuous roller 31, while the rolling elements 32 consists of several individual rollers 32. The rolling elements 31, 32 are arranged spaced apart from each other in the circumferential direction of the cylinder 02. The roller 31 is in contact with all dressings 01 which rest side-by-side on the cylinder 02, while the trailing end of the dressing 01 to be removed is being loosened. With the previously described methods the rolling elements 31, 32 are preferably placed against or moved away from the cylinder 02 by pneumatically operable actuating means 33, 34.

A further method for removing a flexible dressing 01 from a cylinder 02 of a printing press with the aid of rolling elements 31, 32, wherein a first rolling element 31

is arranged on a first support 22, and a second rolling element 32 on a second support 26, and both rolling elements 31 are arranged spaced apart in the circumferential direction of the cylinder 02, wherein several dressings 01 can be arranged side-by-side, preferably in the axial direction, on the cylinder 02, wherein each dressing 01 has suspension legs 03a, 03b beveled off its ends, wherein the cylinder 02 has at least one opening 07 cut into its surface area 06 and has a first wall 04 and a second wall 17, wherein the cylinder 02 has at least one opening 07 cut into its surface area 06, wherein the opening 07 leads to a channel 08 arranged in the cylinder 02 with a holding device with a holding means 12 arranged therein, wherein the holding means 12 of the holding device has a holding position and a release position as its operating positions, can also be distinguished by the following method steps:

The rolling elements 31, 32 are placed against all dressings 01 resting on the surface area 06 of the cylinder 02.

The cylinder 02 rotates until the rolling element 32 arranged on the second support 26 is located above the opening 07 at the trailing end of a dressing 01 to be removed.

The holding means 12 of the holding device changes into its release position.

The rolling element 32 arranged on the second support 26 is moved away from the cylinder 02 at the trailing end of a dressing 01 to be removed, and the suspension leg 03b at the trailing end of the dressing 01 to be removed is released from the opening 07 because of its internal tension, while the dressing 01 remains fixed in place on the surface area 06 of the cylinder 02 because of the pressure of the first



rolling element 31. The end of the dressing 01 to be removed tries to assume a stretched-out length, wherein this end of the dressing 01 remains in contact with the rolling element 32 over a defined spring travel while springing out of the opening 07. Therefore the end springing out follows the rolling element 32 being lifted off the cylinder 02. The suspension legs 03b of the remaining dressings 01 remain in the opening 07, because the ends of these dressings 01 remain pressed against the surface area 06 of the cylinder 02 by the first rolling element 31 assigned to them. The length of a released end of a dressing 01 to be removed from the cylinder 02 is defined by the distance of the contact point of the first rolling element 32 from the opening 07.

The holding means 12 of the holding device changes into its holding position, and all rolling elements 31, 32, or at least the first rolling element 31 in front in the production direction P, can be moved away from the cylinder 02. Thereafter, if required after a rotation of the cylinder 02 counter to its production direction, the dressing 01 to be released can be removed from the surface area 06 of the cylinder 02.

A method for bracing a flexible dressing 01 on a cylinder 02 of a printing press with the aid of rolling elements 31, 32, wherein a first rolling element 31 and a second rolling element 32 are provided, and both rolling elements 31, 32 are arranged spaced apart from each other in the circumferential direction of the cylinder 02, wherein several dressings 01 are arranged side-by-side in the axial direction can also be distinguished in that the rolling elements 31, 32 are individually or in groups placed against the dressings 01 resting on the surface area 06 of the cylinder 02 or moved away from it.

## List of Reference Symbols

01	Dressing, printing forme
02	Cylinder, forme cylinder
03a, 03b	Suspension leg
04	Wall, first
05	-
06	Surface area
07	Opening
08	Channel
09	Bottom
10	-
11	Groove
12	Holding means, lever
13	Wall (08)
14	Spring element
15	-
16	Actuating means
17	Wall, second
18	-
19	-
20	-
21	Holder, cross arm
22	Support, first, resilient sheet metal piece
23	End, first (22)
24	End, second (22)
25	-
26	Support, second, resilient sheet metal piece
27	End, first (26)
28	End, second (26)
29	Stop

- 30 -
- 31 Rolling element, first, pressing element, roll,  
roller
- 32 Rolling element, second, pressing element,  
roll, roller
- 33 Actuating element, first, tube
- 34 Actuating element, second, tube
- 35 -
  
- P Production direction